WHAT IS CLAIMED IS:

1. A one piece anastomosis device for connecting a graft vessel to a target vessel comprising:

a device body formed of a superelastic or pseudoelastic material, the body having an insertion configuration and a tissue holding configuration in which the body has an inner flange and an outer flange, wherein at least one of the inner and outer flanges is radially constrained in the insertion configuration for insertion into the target vessel and when released self deforms to the tissue holding configuration.

2. The device of Claim 1, wherein a portion of the device body between the inner flange and the outer flange is expandable from a first diameter insertion configuration to a second diameter tissue holding configuration.

3. The device of Claim 1, wherein the superelastic or pseudoelastic material is a nickel titanium alloy.

4. The device of Claim 1, further comprising a plurality of tissue penetrating elements for penetrating and holding a graft vessel in place on the device body.

5. The device of Claim 4, wherein the tissue penetrating elements are formed on one of the inner and outer flanges.

6. The device of Claim 4, wherein the tissue penetrating elements extend radially outwardly from the device body for holding an everted end of the graft vessel.

7. The device of Claim 1, wherein the device body uses the superelastic or pseudoelastic properties of the material to self deform from the insertion configuration to the tissue holding configuration.

8. A tube deployed anastomosis system for connecting a graft vessel to a target vessel comprising:

a deployment tube; and

an anastomosis device formed of a superelastic or pseudoelastic material, the device having an insertion configuration and a tissue holding configuration in which the device has an inner flange and an outer flange, wherein the inner and outer flanges are radially constrained in the deployment tube in the insertion configuration for insertion into the target vessel and when released from the deployment tube, the device self deforms to the tissue holding configuration.

9. The device of Claim 8, wherein a portion of the device body between the inner flange and the outer flange is expandable from a first diameter insertion configuration to a second diameter tissue holding configuration.

10. The device of Claim 8, wherein the superelastic or pseudoelastic material is a nickel titanium alloy.

11. The device of Claim 8, further comprising a plurality of tissue penetrating elements for penetrating and holding a graft vessel in place on the device body.

12. The device of Claim 11, wherein the tissue penetrating elements extend radially outwardly from the device body for holding an everted end of the graft vessel.

13. The device of Claim 8, wherein the device body uses the superelastic or pseudoelastic properties of the material to self deform from the insertion configuration to the tissue holding configuration.

14. A method of deploying an anastomosis system for connecting a graft vessel to a target vessel, the method comprising:

connecting a graft vessel to a one piece device formed of a superelastic or pseudoelastic material;

poking a portion of the one piece device through the graft vessel; and

deploying the one piece device by self deformation to a tissue holding configuration in which the device has an inner flange and an outer flange and traps the target vessel tissue between the inner flange and the outer flange.

15. The method of Claim 14, wherein the one piece device is deployed by removing a radially constraining deployment tool from the device.

16. The method of Claim 15, wherein the deployment tool is a deployment tube which receives the tubular device, and wherein the deployment tube is inserted partially into the target vessel wall and then withdrawn to deploy the one piece device from the deployment tube.

17. The method of Claim 14, wherein the one-piece device is deployed by employing the superelastic or pseudoelastic property of a superelastic or pseudoelastic material from which the one piece device is formed.

18. The method of Claim 14, wherein the graft vessel is everted around the one piece device.

19. The method of Claim 14, wherein the deployed one piece device abuts an intima of the graft vessel against an intima of the target vessel.

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